NEW SPECIES OF GREEN ALGAE

EDGAR NELSON TRANSEAU

In the course of my study of the periodicity of occurrence and reproduction of the algae of eastern Illinois during the past several years, a number of undescribed forms have appeared in the collections, of which the following are now sufficiently well known to be described. In accordance with the rules of the Vienna Congress a Latin as well as an English diagnosis is given in each case. Camera drawings from the type material are added together with notes on the relationship and occurrence of each of the new forms. A part of these species have been mentioned in two preliminary papers published by the writer.[1]

ZYGNEMA COLLINSIANUM nov. sp.

Filamentis caespites laete virides efformans; cellulis vegetativis 18–24 μ latis, 1.5–4-plo longioribus; cellulis fructiferis in medio introrsum inflatis; zygosporis globosis (26–40 μ diam.) vel oblongis (26–40 μ × 30–47 μ), maturitate caeruleis, mesosporio scrobiculis magnis ornato; aplanosporis cylindraceo-oblongis (18–24 μ × 40–76 μ), inter cellulis vegetativis sparsis, caeruleis et scrobiculatis.

Filaments forming bright green masses; vegetative cells 18–24 μ × 32–80 μ, fertile cells inflated on the inner side near the middle; zygospores globose (26–40 μ in diam.) to oblong (26–40 μ × 30–47 μ), blue at maturity, median spore wall marked by large pits; aplanospores cylindrical-oblong, 18–24 μ × 40–76 μ, scattered among the vegetative cells, color and markings similar to the zygospores.

This species is evidently closely related to *Zygnema peliosporum* Wittrock, but differs in the dimensions, form, and markings of the spores. It has been found in McCabe's pond and the railroad ditches between Briscoe and Casey, Illinois. In the material from McCabe's pond (Coll. No. 2271) the spores are formed in either of the conjugating filaments or in the tube between the two. Type in herb. E. N. T. Collections No. 1076, 1077. Plate XXV, figures 1–3.

[1] Transeau, E. N., The periodicity of Algae in Illinois. Trans. Amer. Microsc. Soc. **32**: 31–40. 1913; Annotated List of the Algae of Eastern Illinois. Trans. Illinois Acad. Sci. **6**: 69–89. 1913.

ZYGNEMA DECUSSATUM (Vauch.) nov. comb.

Synonyms: *Zygnema pectinatum* (Vauch.) Ag. var. *decussatum* (Vauch.) Kirch., *Zygogonium decussatum* (Vauch.) Kuetzing, *Tyndaridea decussata* Hassall, *Conjugata decussata* Vaucher.

Both *Z. pectinatum* (Vauch.) Ag. and the so-called variety *decussatum* (Vauch.) Kirch. are common in the ponds, pools, and ditches of eastern Illinois. They have little in common except that both form scrobiculate spores in the conjugating tube. They sometimes occur in the same ponds but more frequently not. The species in the permanent ponds is essentially a perennial, while the variety in all stations is a late spring annual. *Z. decussatum* forms vivid green flocculi on the surface of ponds in which it occurs. *Z. pectinatum* is usually submerged and possesses a thick mucilaginous outer wall. The cells of the former are 3–5 times as long as the diameter, of the latter from 1–3 times. The dimensions of the former throughout are but little more than half those of the latter. In view of all these differences it seems best to separate the variety and give it specific rank.

SPIROGYRA NARCISSIANA nov. sp.

Filamentis plerumque sparsis; cellulis vegetativis 12–14 μ latis, diametro 15–30-plo longioribus; chromatophoris singulis, gracilis, laxi anfractibus 2–5; dissepimenta cellularum semireplicata; cellulis fructiferis valde medio inflatis (ventricosis vel quasi quadraticis), 25–33 μ latis, haud abbreviatis; aplanosporis ellipticis vel ovoideis, maturitate flavescentibus, 23–30 μ latis, 50–120 μ longis.

Filaments usually scattered; vegetative cells 12–14 $\mu \times$ 200–400 μ, one chromatophore, slender, making 2–5 turns in the cell; dissepiments semireplicate (i. e. the fold in wall extends only through an arc of 180° instead of 360°, and fold in the wall of the adjoining cell alternates with it); fertile cell much inflated toward the middle, either rounded or quadrate in outline, 25–33 μ in diameter, not shortened; aplanospores elliptical to ovoid, 23–30 $\mu \times$ 50–120 μ, yellow at maturity.

This species is intermediate between the two divisions of the genus: *Conjugata* (Vauch.) Hansg. and *Salmacis* (Bory.) Hansg. This fact together with its aplanosporic habit of reproduction, and the quadrate form of the inflation of the fertile cells, make it a species of peculiar interest. Thus far it has been recorded from the dam at Urban Park, Charleston, Ill., during September and October, 1912. Type in herb. E. N. T. Collections No. 1682, 1663. Plate XXV, figures 4–8.

SPIROGYRA TENUISSIMA (Hass.) Kuetz. var. RUGOSA nov. var.

Cellulis vegetativis 11–13 μ latis; zygosporis 28–32 μ × 55–64 μ, mesosporio subtiliter scrobiculato; ceterum ut in typo. Cum specie passim.

Vegetative cells 11–13 μ in diameter; zygospores 28–32 μ × 55–64 μ, median spore wall minutely pitted, otherwise as in the type. Occurring with the species.

This variety approaches the upper limits of the species in size, and is readily distinguished by its pitted median spore wall. It has been recorded from ponds at Charleston, Casey, and Lerna, a ditch at Dorans, and a small stream southwest of Wrightsville, Illinois. Type in herb. E. N. T. Collections No. 1871, 2270.

SPIROGYRA INFLATA (Vauch.) Rab. var. FOVEOLATA nov. var.

Cellulis vegetativis et fructiferis ut in typo, zygosporis mesosporio scrobiculato instructis. Cum specie passim.

Vegetative cells and fertile cells as in the type, zygospores with median wall scrobiculate. Occurring with the species.

This variety has been found in the Ice Plant pond, Casey, and in Campus Creek, Charleston, Illinois. It differs from the type only in the very distinct markings of the median spore wall. Type in herb. E. N. T. Collections No. 783, 784.

SPIROGYRA RECTANGULARIS nov. sp.

Filamentis plerumque sparsis; cellulis vegetativis 35–40 μ latis, 4–9-plo longioribus, dissepimenta replicata; chromatophoris 2–4, anfractibus 2–5; cellulis fructiferis medio valde inflatis, quadraticis, 48–70 μ latis; zygosporis ovatis vel cylindraceo-ovoideis, apice rotundatis, 45–65 μ latis, 75–120 μ longis; maturitate fuscescentibus.

Filaments usually scattered; vegetative cells 35–40 μ × 150–320 μ, dissepiments replicate; chromatophores 2–4, making 2–5 turns in the cell; fertile cells quadrately inflated toward the middle, 48–70 μ in diameter; zygospores ovoid to cylindrical-ovoid, with rounded ends, 45–65 μ × 75–120 μ; yellowish-brown at maturity.

This species is related to *S. quadrata* (Hass.) Petit, which occurs in its typical form in an adjoining pond. It differs in its larger dimensions throughout, greater number of chromatophores, and the form of the zygospores. It has been found for several years in the West Tile Factory pond, Charleston, and a pond on the Gray farm southeast of Lerna, Illinois. Fruits during May. Type in herb. E. N. T. Collection No. 788. Plate XXV, figures 9–11.

SPIROGYRA PRATENSIS nov. sp.

Caespites flavo-virides efformans; cellulis vegetativis 17–20 μ latis, 4–12-plo longioribus; chromatophoris singulis vel binis, anfractibus 1–8; generatio zygosporis vel aplanosporis ortis (conjugatio lateralis vel scalaris); cellulis fructiferis inflatis, ad 55 μ latis; cellulis sterilis tum cylindraceis tum inflatis vel bullatis (ad 90 μ latis); sporis ovoideis, ellipticis vel cylindraceo-ellipticis, 24–36 μ latis, 50–70 μ longis, maturitate flavescentibus.

Forming yellowish green masses; vegetative cells 17–20 μ in diameter, 80–240 μ in length, chromatophores one or two in a cell, making from 1–8 turns; reproduction by zygospores and aplanospores, conjugation lateral and scalariform; fertile cells inflated, up to 55; sterile cells cylindrical, inflated, or bullate (diam. up to 90 μ); spores ovoid, elliptical, or cylindrical with rounded ends, 24–36 μ × 50–70 μ, yellow at maturity.

This species combines most of the characteristics of *S. mirabilis* (Hass.) Kuetz. and *S. polymorpha* Kirchner. From the former it differs in its dimensions (almost all living cells measure exactly 20 μ regardless of the habitat), in the constant occurrence of cells in the filaments with two chromatophores, in its regular production of zygospores, and in the tendency of the sterile cells to be inflated. *S. mirabilis* has been collected in this territory and like the European specimens varies considerably in dimensions, the cell diameter up to 27, and it showed no cells with two chromatophores, and lacked the inflated sterile cells. From *S. polymorpha* this species differs in its dimensions, in its regular production of aplanospores, and in the presence of inflated sterile cells. As shown in the figures some of the fertile cells containing aplanospores have developed protuberances as in conjugation, but apparently without reference to adjoining filaments, as they show a definite tendency to alternate in successive cells. Another interesting feature is the occasional occurrence of cells containing aplanospores which have become attached to sterile cells, but the terminal wall of the protuberance has not been dissolved. This species is probably common in Illinois. I have recorded it from all the larger ponds, and Campus creek at Charleston; also from the Brookhart farm pond southwest of Oilfield. Type in herb. E. N. T. Collections No. 1103, 1822. Plate XXV, figures 12–14; Plate XXVI, figures 1–2.

SPIROGYRA CATENAEFORMIS (Hass.) Kuetz. var. PARVULA nov. var.

Filamentis plerumque sparsis; cellulis vegetativis 20–24 μ latis, 2–5-plo longioribus; chromatophoro uno, anfractibus 1–6; cellulis

fertilis ad 37 μ latis inflatis; conjugatione plerumque laterali, rarius scalariformia; zygosporis flavescentibus, ellipticis, 20–27 μ latis, 40–60 μ longis.

Filaments usually scattered; vegetative cells 20–24 μ × 50–105 μ, chromatophore one in each cell, making 1–6 turns; fertile cells inflated up to 37 μ; conjugation mostly lateral, sometimes scalariform; zygospores yellow, elliptical, 20–27 μ × 40–60 μ.

This variety is of such common and general occurrence both in association with the type and without it, and intergrading forms are so rare—especially in the matter of the spores—that it seems advisable to give it a name. It differs principally in its smaller dimensions throughout and in the relatively shorter spores. In this vicinity *S. catenaeformis* usually has a cell diameter of 27–30 μ, rarely as low as 24 μ, while the spore diameter varies from 27–33 μ, usually being 30 μ, with a length of from 2–3 times the diameter. I have recorded the variety from ponds at Charleston, Casey, Oilfield, Lawrenceville, and Lerna. Type in Herb. E. N. T. Collection No. 1876. Plate XXVI, figures 3–4.

SPIROGYRA CIRCUMLINEATA nov. sp.

Cellulis vegetativis 40–48 μ latis, diametro 3–6-plo longioribus, dissepimentis planis; chromatophoro uno, gracili, anfractibus 4–8; cellulis fructiferis uno latere (in quo conjugatio sequiter) inflatis, altero rectis; zygosporis ellipticis, 40–50 μ latis, 70–125 μ longis, maturitate fuscescentibus, episporio lineamento uno plus minus longitudinaliter instructo.

Vegetative cells 40–48 μ in diameter, 120–240 μ in length, dissepiments plane; chromatophore one, slender, making 4–8 turns in the cell; fertile cells swollen on the conjugating side only; zygospores elliptical, 40–50 μ × 70–125 μ, yellowish-brown at maturity, the outer spore wall marked by a more or less longitudinal line.

This species in so far as its fertile cells are concerned has much the same appearance as *S. varians* (Hass.) Kuetz., which occurs in the same ponds. From this species it is distinguished by the larger dimensions throughout, by the greater number of turns of the chromatophore, the absence of inflated sterile cells, and the rather prominent line extending around the spore. Recorded only from Marshall pond, four miles north of Charleston, Illinois, and the ponds on the Gray farm southeast of Lerna. Fruits during May and early June. Type in herb. E. N. T. Collection No. 1353. Plate XXVI, figures 5–6.

SPIROGYRA VELATA OCCIDENTALIS nov. var.

Caespites laete virides efformans; cellulis vegetativis 36–53 μ latis, diametro 3–7-plo longioribus; chromatophoris 1–3, anfractibus 2–6; cellulis fructiferis cylindraceis vel inflatis, ad 66 μ latis; zygosporis ovoideis, 36–56 μ latis, mesosporio scrobiculato, maturitate fuscescentibus.

Forming bright green masses; vegetative cells 36–53 μ in diameter, 125–300 μ in length; chromatophores 1, 2, or 3, making 2–6 turns in the cell; fertile cells cylindrical or enlarged up to 66 μ in diam.; zygospores ovoid, 36–56 μ × 57–105 μ, median spore wall scrobiculate; spore color at maturity yellowish brown.

This species has been found in the remnant of an old prairie pond on the Brookhart farm, southwest of Oilfield, and the small stream at Lerna, Illinois. It is closely related to *S. velata* Nordst., from which it differs in the number of chromatophores, larger dimensions of the vegetative cells, and the color of the mature spores. Type in herb. E. N. T. Collection No. 1826. Plate XXVI, figures 8–9.

SPIROGYRA PUNCTIFORMIS nov. sp.

Filamentis plerumque sparsis; cellulis vegetativis 27–30 μ latis, 4–14-plo longioribus, dissepimentis planis; chromatophoris gracilis 1–2, anfractibus 3–6; cellulis fructiferis inflatis (44–50 μ latis); cellulis femineis 100–250 μ longis, masculis 90–140 μ, singulis vel binis cellulis vegetativis alternis; tubo conjugationis plerumque ex cellula mascula emisso; zygosporis 40–48 μ × 60–110 μ, ovatis vel cylindraceo-ovoideis, mesosporio punctulis obsito, maturitate flavescentibus.

Filaments usually scattered; vegetative cells 27–30 μ × 120–390 μ, end walls plane; chromatophores one or two, narrow, making from 3–6 turns in the cell; fertile cells inflated (44–50 μ in diam.); female cells 100–250 μ long, male cells 90–140 μ long, occurring singly or in pairs, alternating with vegetative cells; conjugating tube usually produced by the male cell; zygospores ovate to cylindrical-ovoid, 40–48 μ × 60–110 μ, median spore wall punctate, yellow when mature.

In some respects this species resembles *S. punctata* Cleve, but differs in the number of chromatophores, in the size and form of the zygospores, and the frequent occurrence of the conjugating cells in pairs. Of considerable interest is the fact that the male cell is always shorter than the female. It fruits from late May to July in the New, and East Tile Factory ponds, Charleston, Illinois. Type in herb. E. N. T. Collections No. 627, 1986. Plate XXVI, figure 7.

SPIROGYRA ELLIPSOSPORA nov. sp.

Filamentis saturate viridibus, lubricis; cellulis vegetativis 125–

150 μ latis, diametro 1–3-plo longioribus; chromatophoris 3–8, anfractibus ½–4; zygosporis ellipticis plus minus acuminatis, fuscescentibus, 100–140 μ latis, 160–255 μ longis.

Filaments dark green, lubricous; vegetative cells 125–150 μ × 125–500 μ; chromatophores 3–8, making ½–4 turns in a cell; zygospores elliptical with more or less pointed ends, brownish yellow at maturity, 100–140 μ × 160–255 μ.

The vegetative filaments of this form are quite indistinguishable from those of *S. crassa* Kuetz. which also occurs in this vicinity. The form and dimensions of the spores however are amply distinct. Known from the pond at the western edge of Casey, and from Hodgen's pond, Charleston, Illinois. Fruits during the summer and early autumn. Type in herb. E. N. T. Collections No. 1485, 1406, 1403, 766, 769, 1352. Plate XXVII, figure 1.

SPIROGYRA ELLIPSOSPORA var. CRASSOIDEA nov. var.

Cellulis vegetativis 140–150 μ latis, diametro 1–4-plo longioribus; zygosporis late ellipticis et secundum positionem apice attenuatis, 120–140 μ latis, 145–255 μ longis; ceterum ut in typo.

Vegetative cells 140–150 μ × 140–560 μ, zygospores compressed elliptical, ends broadly rounded in one position, sharply pointed in another, 120–140 μ × 145–255 μ; otherwise as in the type.

This variety has been recorded only from the Tile Factory ponds, Charleston. The form of the spore distinguishes it from the type, and the fact that the spores are compressed elliptical instead of compressed ovate separates it from *S. crassa* Kuetz. Type in herb. E. N. T. Collection No. 1507. Plate XXVII, figure 2.

SPIROGYRA SUBMAXIMA nov. sp.

Filamentis plerumque caespites saturate virides lubricos efficientibus, rarius sparsis; cellulis vegetativis 70–110 μ latis, diametro 1½–4-plo longioribus; chromatophoris 8–9, anfractibus .1–1; cellulis fructiferis tum modice tumidis tum cylindraceis; zygosporis lentiformibus, maturitate bruneis, crass. 50–75 μ, diam. 70–100 μ, mesosporio levi.

Filaments usually forming dark green lubricous masses, more rarely scattered; vegetative cells 70–110 μ in diameter, 100–300 μ long; chromatophores 8–9, making 1/10 to 1 turn in a cell; fertile cells slightly inflated or cylindrical; sterile cells not enlarged; zygospores lenticular, brown, 50–75 μ in thickness, 70–110 μ in diameter; median spore wall smooth.

This species has commonly a very thick pectose sheath, occasionally as thick as 17μ. It is distinguished from *S. maxima* (Hass.) Wittr. by

the greater number of chromatophores, by the longer cells as compared with the width, by the smaller dimensions throughout, and the smooth median wells of the zygospores. From *S. majuscula* Kuetz. it is readily separated by the larger dimensions, number of chromatophores, and usually the greater curvature of the chromatophores. During some seasons this alga begins to fruit in May and continues to fruit until September. In other years spore formation extends from July to November. Thus far it has been recorded only from the East Big Four pond, three miles east of Charleston, and a "cut off" from Polecat creek, south of Ashmore. Type in herb. E. N. T. Collections No. 233, 246, 1461, 1647. Plate XXVII, figures 3–4.

SPIROGYRA ILLINOIENSIS nov. sp.

Filamentis in caespites sordide virides et intricatos consociatis; cellulis vegetativis 65–85 μ latis, diametro 1.5–4-plo longioribus; chromatophoris 6–9, angustis, modo subrectis longitudinalibus, modo spiralibus, anfractibus .1–1; cellulis conjugatis abbreviatis, paulo inflatis et geniculatis, canalis conjugationis brevis et latis; cellulis masculis brevioribus quam femineis; zygosporis 85–115 μ diam., 140–190 μ longis, ovato-ellipticis vel ellipticis, mesosporio crasso et punctato, maturitate flavescentibus.

Filaments forming dull green tangled masses; vegetative cells 65–85 $\mu \times$ 100–300 μ; chromatophores 6–9, narrow, nearly straight and longitudinal, or spiral, making from .1–1 turn in the cell; conjugating cells shortened, somewhat inflated and geniculate, conjugating tube short and broad; male cell shorter than the female; zygospores 85–115 $\mu \times$ 140–190 μ, ovoid-elliptical to elliptical in form, median spore wall thick and punctate, yellow when mature.

Evidently related to *S. stictica* (Eng. Bot.) Wille, from which it is distinguished by the larger dimensions throughout, greater number of chromatophores, and the punctate walled spores. From *S. ceylanica* Wittr. it differs in the number of chromatophores, and the markings of the spore wall. Conjugation is initiated by the bending of the gametangia and the development of slight prominences on both cells. This is followed by a mucilaginous secretion at the point of contact, which may persist as a ring about the tube for some days after the union of the cells is complete. After contact the chromatophores of the gametangia become greatly enlarged and engorged with starch and fatty bodies, enlargement of the cells continues, but stops in the case of the male cell when the male gamete passes over.

This species has been found only in the pond on the Gray farm,

southeast of Lerna, Illinois. It fruits during May. Type in herb. E. N. T. Collections No. 1377, 1374, and 1842. Plate XXVIII, figures 1–3.

MOUGEOTIA TUMIDULA nov. sp.

Cellulis vegetativis 6–8.5 μ latis, 10–20-plo longioribus; zygosporis inter 4 cellulas sitis, tumidis quadrangularibus 22–26 $\mu \times$ 26–30 μ, a latere visis ellipticis, angulis retusis, mesosporio hyalino evidenter subtiliter scrobiculato.

Vegetative cells 6–8.5 $\mu \times$ 70–120 μ, zygospores adjoined by four cells; quadrate, somewhat tumid, 22–26 $\mu \times$ 26–30 μ, elliptical when seen from the side, angles retuse, median spore wall distinctly but minutely scrobiculate.

This species resembles in size and retuse corners of the zygospore *Mougeotia viridis* (Kuetz.) Wittr. but differs in having the spore walls convex instead of concave, scrobiculate instead of smooth. It differs from *M. gracillima* (Hass.) Wittr. in its larger size, retuse angled spores, and the convex spore walls. Type in herb. E. N. T. Collection No. 744. Found thus far only in the Embarras river, Wheeler, Illinois, Sept. 1911. Plate XXVIII, figure 4. (Scale of figure 1 cm. = 25 μ.)

OEDOGONIUM PRATENSE nov. sp.

Oedogonium dioicum, macrandrium, oogoniis singulis, rarissime binis, subdepresso-globosis vel late pyriformi-globosis, opercula apertis, circumscissione mediana, angusta sed distincta; oosporis depresso-globosis vel subglobosis, partem oogoniorum inflatum complentibus, membrana laevi; plantis masculis paulo gracilioribus quam femineis; antheridiis 1–2-cellularibus, saepe cum cellulis vegetativis alternis; spermatozoidis singulis; cellula fili basali forma, ut vulgo elongata;

crassit. cell. veget. plant. fem.	10–17 μ,	altit. 35–95 μ;
crassit. cell. veget. plant. masc.	8–15 μ,	altit. 30–70 μ;
crassit. oogon.	33–40 μ,	altit. 33–50 μ;
crassit. oospor.	32–38 μ,	altit. 28–35 μ;
crassit. cell. antherid.	10–14 μ,	altit. 13–18 μ.

Dioecious, macrandrous, oogonia single, very rarely two, subdepressed globose or broadly pyriform-globose, operculate, division median, narrow but distinct; oospore depressed globose or subglobose. filling or nearly filling the inflated portion of the oogonium, membrane smooth; male plants more slender than the female; antheridia 1–2-celled, usually alternating with vegetative cells; sperms single; basal cell of filament commonly elongated;

diam. veg. cell, female plant..... 10–17 μ, length 35–95 μ;
diam. veg. cell, male plant..... 8–15 μ, length 30–70 μ;
diam. oogonia..... 33–40 μ, length 33–50 μ;
diam. oospores..... 32–38 μ, length 28–35 μ;
diam. antheridial cells..... 10–14 μ, length 13–18 μ.

The forms nearest to this species are *Oe. acmandrium* Elfv. and *Oe. psaegmatosporum* Norsdt. From these it is distinguished by its larger dimensions and dioecious habit. Among the poriferous species it bears some resemblance to *Oe. rufescens* Wittr. This species has been collected in Anderson's pools, on the Big Four R. R. right of way, just east of Charleston, Illinois, and in the ponds southeast of Lerna. It fruits in May. Type in herb. E. N. T. Collection No. 1797. Plate XXIX, figures 9–12.

OEDOGONIUM PRATICOLUM nov. sp.

Oedogonium dioicum, (?) nannandrium, idioandrosporum; oogoniis singulis vel rarius 2–7-continuis, ellipsoideis vel globoso-ellipsoideis, saepe terminalis, rarius sparsis; membrana oogonii interdum subcrassa, operculo apertis, circumscissione suprema, operculo minimo, deciduo; oosporis eadem forma ac oogoniis, haec plane complentibus, membrana laevi; cellulis suffultoriis eadem forma ac cellulis ceteris; plantis masculis paululo gracilioribus quam femineis; androsporangiis 1–20-cellularibus; cellulis vegetativis leviter capitellatis; cellula fili basali forma, ut vulgo, elongata; cellula terminali apice apiculata vel in setam longam, tenuem, hyalinam, producta;

crassit. cell. veget. plant. fem..... 16–26 μ, altit. 75–100 μ;
crassit. cell. veget. plant. masc..... 14–22 μ, altit. 60–100 μ;
crassit oogon..... 48–60 μ, altit. 62– 74 μ;
crassit. oospor..... 46–58 μ, altit. 60– 72 μ;
crassit. cell. androsp..... 20–24 μ, altit. 18– 22 μ.

Dioecious, (?) nannandrous, idioandrosporous; oogonia single or more rarely in groups of 2–7, ellipsoid to globose-ellipsoid, often terminal, sometimes scattered; oogonium wall sometimes rather thick, operculate, division at the upper extremity of the oogonium, lid very small, deciduous; oospores of the same form as the oogonia, which they completely fill, wall smooth; suffultory cells similar to the other vegetative cells; male filaments a little smaller than the female; androsporangia 1–20-celled; vegetative cells slightly capitellate; basal cell of filament usually elongate; terminal cell apiculate or extended into a long, hyaline, tenuous seta;

diam. veg. cells, female plant..... 16–26 μ, length 75–100 μ;
diam. veg. cells, male plant..... 14–22 μ, length 60–100 μ;

diam. oogonia..... 48–60 μ, length 62– 74 μ;
diam. oospores..... 46–58 μ, length 60– 72 μ;
diam. androsporangial cells..... 20–24 μ, length 18– 22 μ.

This species is closely related to *Oe. obtruncatum* Wittr. It differs in being idioandrosporous, having generally larger dimensions, and in the form of the terminal cell. It has been found in Hodgen's pond, and the East Big Four pond, Charleston, Illinois. Fruits in summer and autumn. Type in herb. E. N. T. Collections No. 1967, and 1963. Plate XXIX, figures 1–5.

OEDOGONIUM ILLINOIENSE nov. sp.

Oedogonium dioicum, nannandrium, gynandrosporum; oogoniis singulis, subglobosis vel oboviformi-globosis, poro mediano apertis; oosporis globosis vel subglobosis, oogonia fere complentibus, membrana duplici; episporio costis spiraliter dispositis, costis spiralibus numero 4–7, utrinque in polo, in sectione horizontali, fere mediano, nunquam verticali sito conniventibus, endosporio laevi; cellulis suffultoriis tumidis; androsporangiis 1–5-cellularibus; cellula fili basali forma, ut vulgo, elongata; nannandribus palululum curvatis, in cellulis suffultoriis sedentibus, antheridio exteriore, 1–4-cellulari;

crassit. cell. veget..... 13–18 μ, altit. 76–129 μ;
crassit. cell suffult..... 32–40 μ, altit. 50– 73 μ;
crassit. oogon..... 51–60 μ, altit. 60– 70 μ;
crassit. oospor..... 45–56 μ, altit. 48– 66 μ;
crassit. cell. androsp..... 13–17 μ, altit. 17– 22 μ;
crassit. stip. nannandr..... 14–17 μ, altit. 37– 57 μ;
crassit. cell. antherid..... 9–12 μ, altit. 15– 23 μ.

Dioecious, nannandrous, gynandrosporous; oogonia sugblobose to oboviform-globose, occurring singly in the filaments; pore median; oospores globose or subglobose, nearly filling the oogonia, membrane double; the outer spore wall marked by 4–7 spiral ribs uniting at the poles, the polar axis always placed in a transverse position, never parallel with the filament, the inner spore wall smooth; suffultory cells swollen; androsporangia 1–5-celled; basal cell of the filament elongated; dwarf males slightly curved resting on the suffultory cell, antheridium exterior, 1–4-celled;

diam. vegetative cells..... 13–18 μ, length 76–120 μ;
diam. suffultory cells..... 32–40 μ, length 50– 73 μ;
diam. oogonia..... 51–60 μ, length 60– 70 μ;
diam. oospores..... 45–56 μ, length 48– 66 μ;
diam. androsporangia..... 13–17 μ, length 17– 22 μ;
diam. dwarf male stipe..... 14–17 μ, length 37– 57 μ;
diam. antheridia..... 9–12 μ, length 15– 23 μ.

Belongs near *Oe. spirale* Hirn, from which it differs in being gynandrous, in having narrower and longer vegetative cells, swollen suffultory cells. Occurs in the Gray ponds southeast of Lerna, Illinois. Type in herb. E. N. T. Collections No. 1361, 1364. Plate XXIX, figures 6–8.

OEDOGONIUM PAUCO-COSTATUM nov. sp.

Oedogonium dioicum, macrandrium; oogoniis singulis, ellipsoideis, opercula apertis, circumscissione superiore; oosporis ellipsoideis, oogonia fere complentibus, membrana triplici: episporio, in latere exteriore, laevi, mesosporio longitudinaliter costato, costis integris, interdum anastomosantibus, in medio oosporae c : a 15–19; antheridiis 2–8-cellularibus; spermatozoidis binis, divisione horizontali ortis; cellula fili terminali obtusa, cellula basali forma, ut vulgo, elongata;

crassit. cell. veget. plant. fem.....(15–) 20–27 μ, altit. 70–155 μ;
crassit. cell. veget. plant. masc....(15–) 19–25 μ, altit. 70–160 μ;
crassit. oogon..... 54–60 μ, altit. 70–104 μ;
crassit. oospor..... 50–56 μ, altit. 66– 90 μ;
crassit. cell. antherid..... 18–23 μ, altit. 8– 12 μ.

Dioecious, macrandrous, cogonia single, ellipsoid, operculate, division superior; oospore elliptical nearly filling the oogonium, membrane triple: outer wall smooth on the outer side, median wall longitudinally ribbed, ribs from 15–19 in number, inner wall smooth; antheridia 2–8-celled; sperms two, division horizontal; terminal cell obtuse, basal cell usually elongate;

diam. veg. cells, female fil.....(15–) 20–27 μ, length 70–155 μ;
diam. veg. cells, male fil.....(15–) 19–25 μ, length 70–160 μ;
diam. oogonia..... 54–60 μ, length 70–104 μ;
diam. oospores..... 50–56 μ, length 66– 90 μ;
diam. antheridial cells..... 18–23 μ, length 8– 12 μ.

This species is near *Oedogonium Australicum* Hirn, but differs in being larger in most dimensions, in having elliptical instead of globose-elliptical spores, and in having a smaller number of ribs on the median spore wall. It has been recorded only from the Ice Plant pond, Casey, Illinois, where it was associated with *Oe. praticolum* (described above) and *Oe. taphrosporum* Nordst. and Hirn. during July, 1912. Type in herb. E. N. T. Collection No. 1495. Plate XXVIII, figure 5.

NORMAL SCHOOL,
CHARLESTON, ILL.

EXPLANATION OF PLATES XXV–XXIX

PLATE XXV

FIG. 1. Fertile cells of *Zygnema Collinsianum* showing variable position of zygospore in one or the other filament, or in the tube.

FIG. 2. Mature zygospores of *Zygnema Collinsianum*.

FIG. 3. Mature aplanospore and rhizoid of *Zygnema Collinsianum*.

FIGS. 4–8. Vegetative cells and aplanospores of *Spirogyra Narcissiana*.

FIGS. 9–11. *Spirogyra rectangularis*.

FIGS. 12–13. Spirogyra pratensis forming aplanospores.

FIG. 14. Lateral conjugation in *Spirogyra pratensis*.

PLATE XXVI

FIG. 1. Scalariform conjugation in *Spirogyra pratensis*.

FIG. 2. Usual form of vegetative cells of *Spirogyra pratensis*.

FIGS. 3–4. *Spirogyra catenaeformis* var. *parvula*.

FIGS. 5–6. *Spirogyra circumlineata*.

FIG. 7. *Spirogyra punctiformis*.

FIGS. 8–9. *Spirogyra velata* var. *occidentalis*.

PLATE XXVII

FIG. 1. *Spirogyra ellipsospora*.

FIG. 2. Two views of spore of *Spirogyra ellipsospora* var. *crassoidea*.

FIG. 3. Vegetative cell of *Spirogyra submaxima* showing mucilaginous sheath.

FIG. 4. Zygospores of *Spirogyra submaxima*.

PLATE XXVIII

FIGS. 1–3. Stages in conjugation of *Spirogyra illinoiensis*.

FIG. 4. Mature spore of *Mougeotia tumidula*. This figure is drawn to a larger scale than the others, 10 mm. = 25 μ.

FIG. 5. *Oedogonium pauco-costatum*.

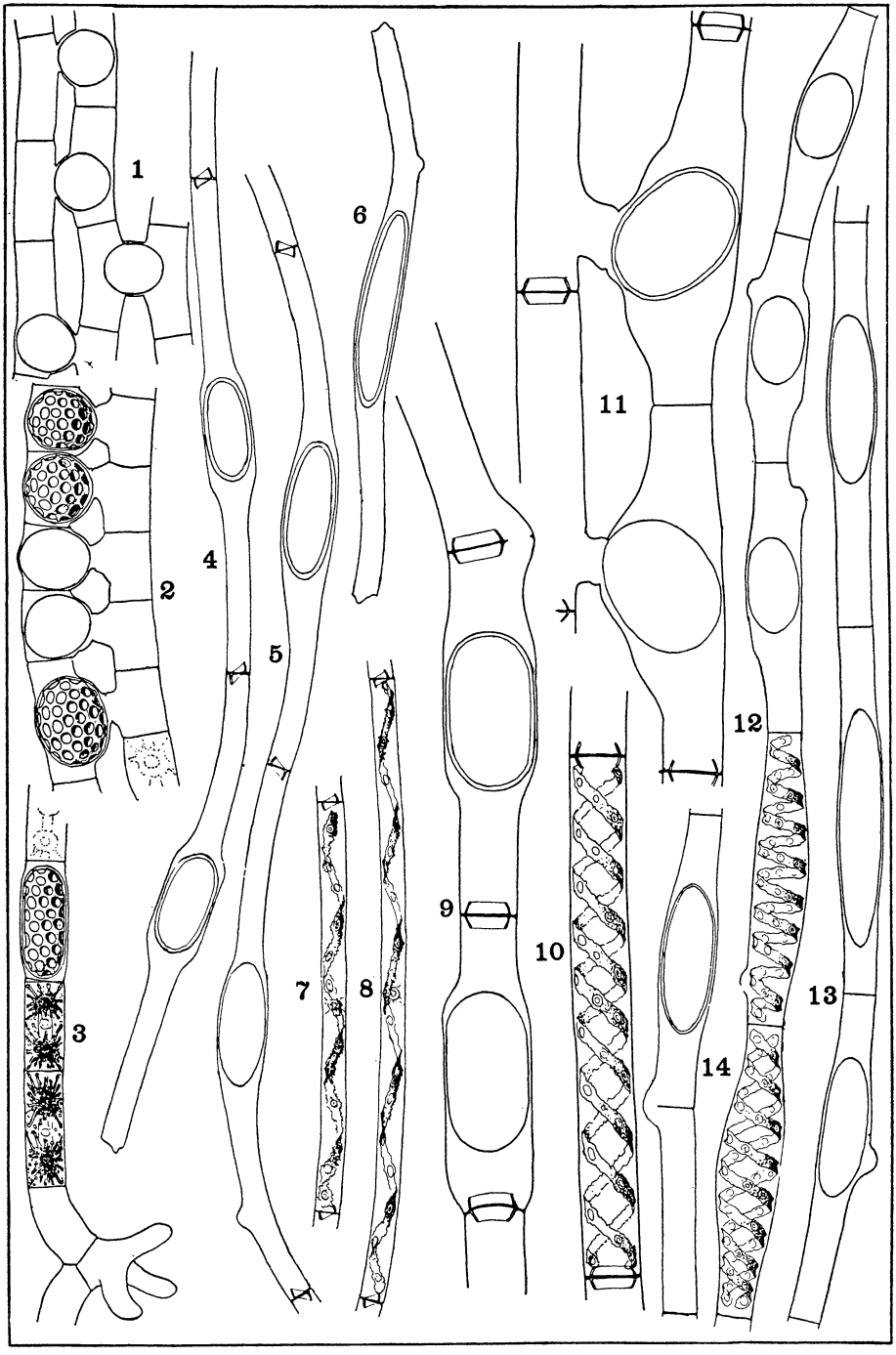
PLATE XXIX

FIGS. 1–5. *Oedogonium praticolum*.

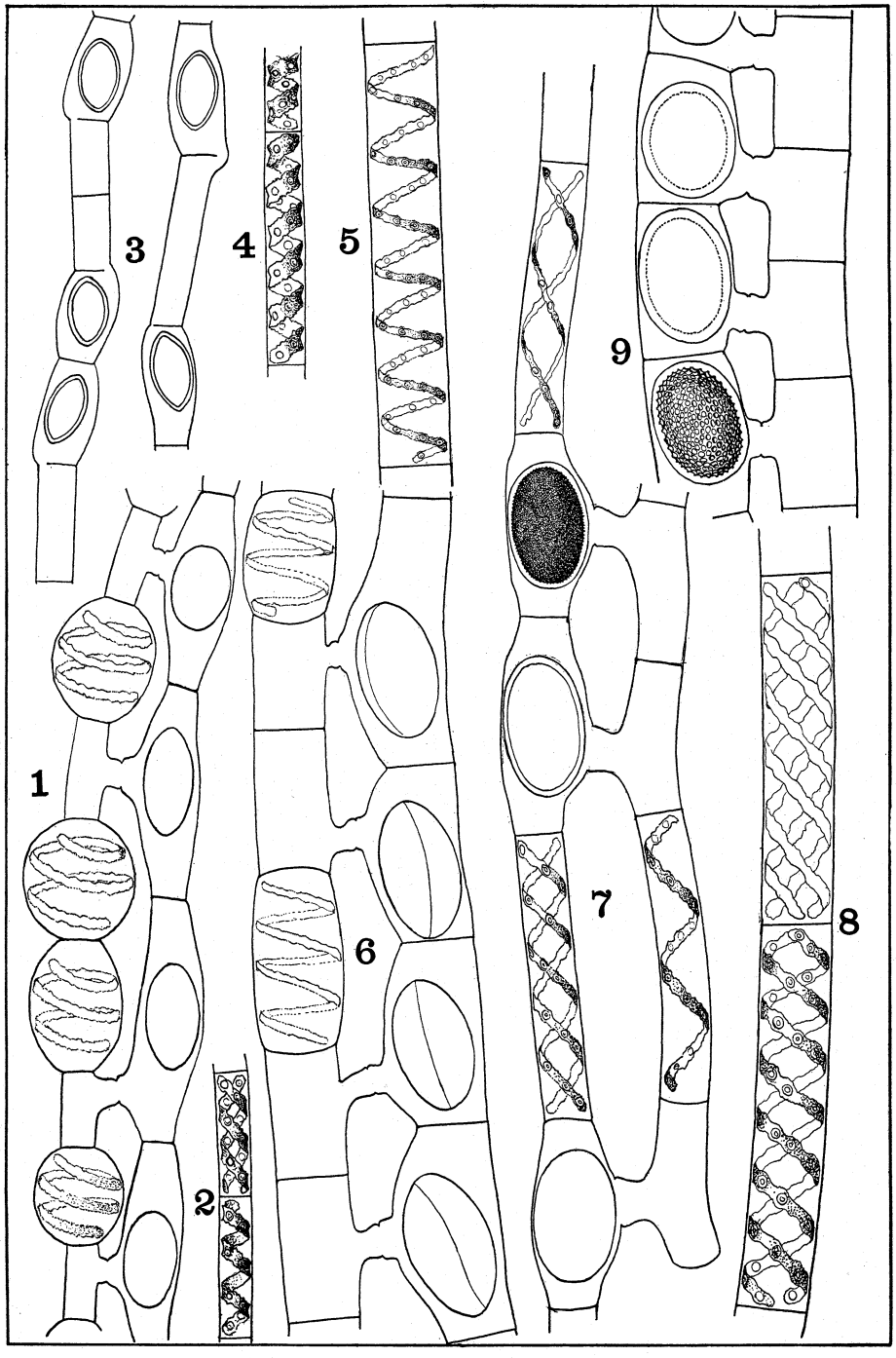
FIGS. 6–8. *Oedogonium illinoiense*.

FIGS. 9–12. *Oedogonium pratense*.

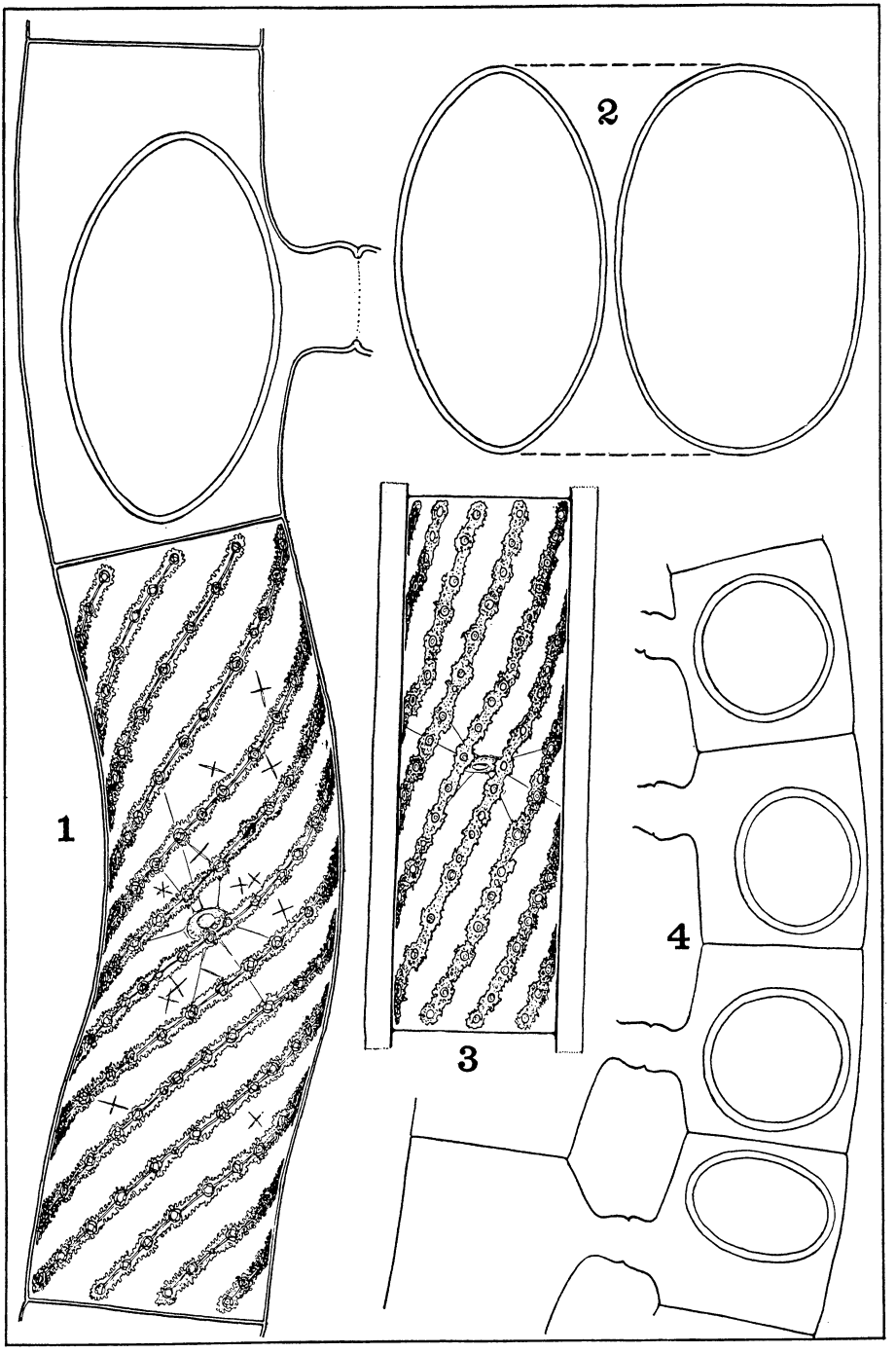
Scale of all drawings, with exception of one noted above, 10 mm. = 45 μ.



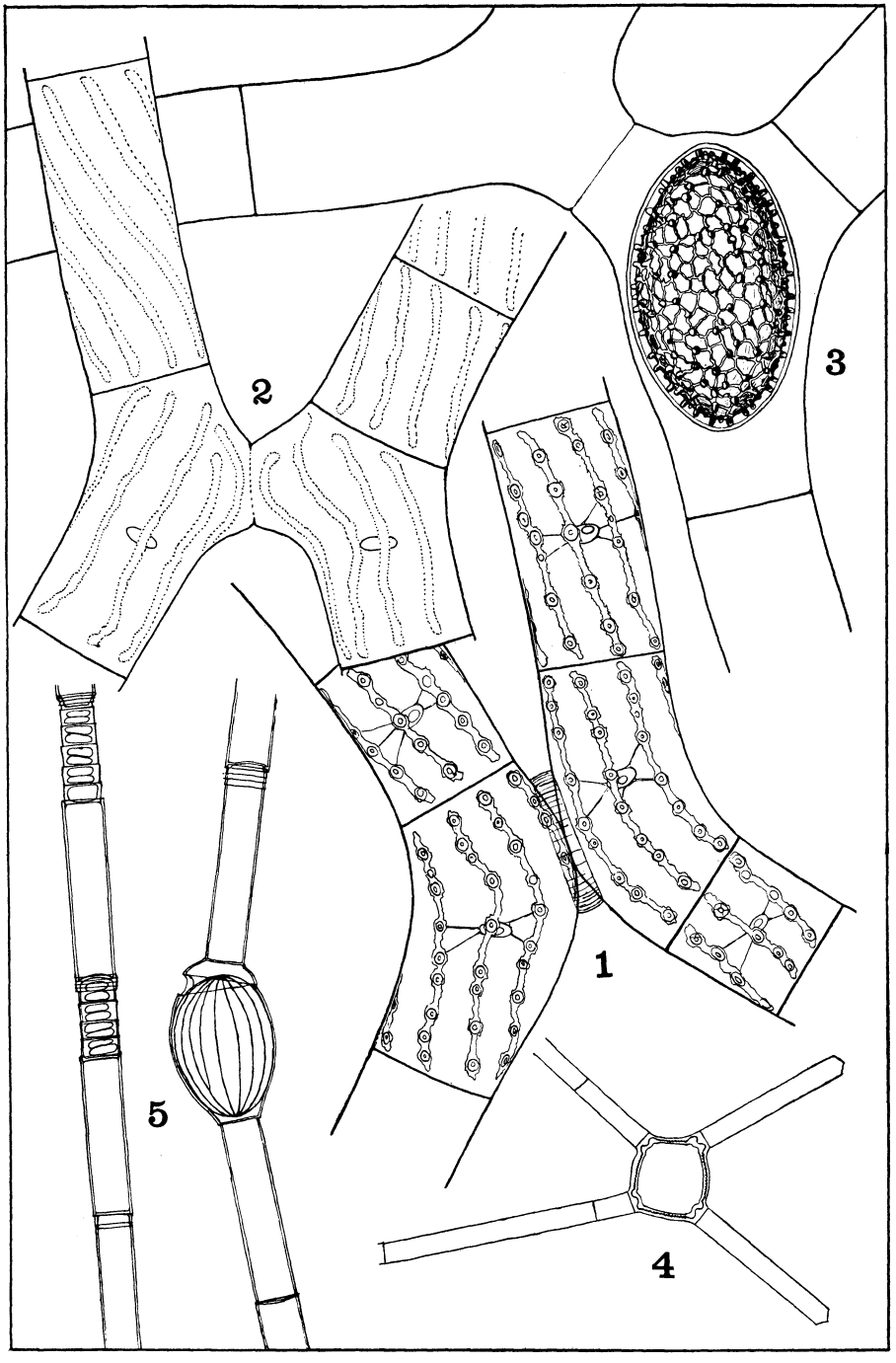
TRANSEAU: NEW SPECIES OF GREEN ALGÆ.



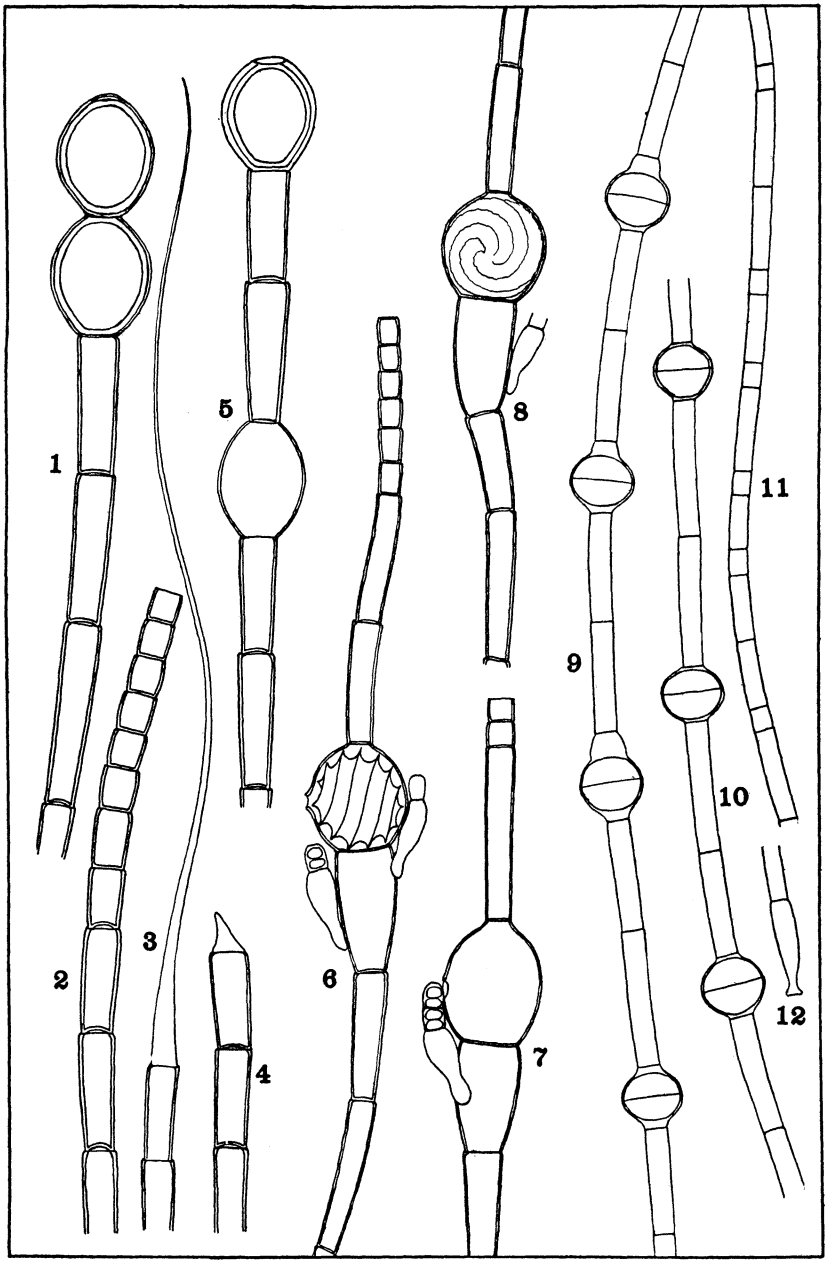
TRANSEAU: NEW SPECIES OF GREEN ALGÆ.



TRANSEAU: NEW SPECIES OF GREEN ALGÆ.



TRANSEAU: NEW SPECIES OF GREEN ALGÆ.



TRANSEAU: NEW SPECIES OF GREEN ALGÆ.